



SEQUENCE LISTING

<110> Nagata, Leslie P.
Wong, Jonathan P.

<120> A STRAIN OF THE WESTERN EQUINE ENCEPHALITIS VIRUS (AS AMENDED)

<130> NEL-001

<140> 10/023,649
<141> 2001-12-21

<150> 60/256,948
<151> 2000-12-21

<160> 49

<170> PatentIn version 3.1

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<212> DNA
<213> western equine encephalomyelitis virus - strain 71V-1658

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<223> encodes nucleocapsid, E3, E2, 6K and E1 proteins

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Ala Asp Ser Pro Tyr Val Lys Ser Leu Gln Arg Thr Phe Pro Gln Phe
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Glu Ile Glu Ala Arg Gln Val Thr Asp Asn Asp His Ala Asn Ala Arg
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Ser Asn His Arg Tyr His Cys Ile Cys Pro Met Ile Ser Ala Glu Asp
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cag	gac	cta	act	gcg	gag	tgt	gcg	aag	cct	cgt	gga	ctg	gcc	gaa	5367
Gln	Asp	Leu	Thr	Ala	Glu	Cys	Ala	Lys	Pro	Arg	Gly	Leu	Ala	Glu	
			1770					1775					1780		
ata	atg	caa	gac	ttc	aat	act	gct	cct	ttc	cag	ttt	ctt	tcg	gac	5412
Ile	Met	Gln	Asp	Phe	Asn	Thr	Ala	Pro	Phe	Gln	Phe	Leu	Ser	Asp	
			1785					1790					1795		
tac	aga	cca	gta	ccg	gca	cca	cgg	aga	cg	ccc	atc	cca	tca	cct	5457
Tyr	Arg	Pro	Val	Pro	Ala	Pro	Arg	Arg	Arg	Pro	Ile	Pro	Ser	Pro	
			1800					1805					1810		
aga	tcg	acg	gct	tcc	gca	cct	cca	gtt	cca	aag	cca	cgc	agg	act	5502
Arg	Ser	Thr	Ala	Ser	Ala	Pro	Pro	Val	Pro	Lys	Pro	Arg	Arg	Thr	
			1815					1820					1825		
aag	tac	caa	caa	cca	cca	gga	gtc	gct	aga	gcg	atc	tca	gaa	gcg	5547
Lys	Tyr	Gln	Gln	Pro	Pro	Gly	Val	Ala	Arg	Ala	Ile	Ser	Glu	Ala	
			1830					1835					1840		
gag	ttg	gac	gag	tac	atc	cgt	caa	cac	tcc	aac	tga	cgg	tat	gaa	5592
Glu	Leu	Asp	Glu	Tyr	Ile	Arg	Gln	His	Ser	Asn		Arg	Tyr	Glu	
			1845					1850						1855	
gcg	gga	gcg	tat	att	ttc	tca	tcg	gaa	aca	ggc	caa	ggt	cac	ctt	5637
Ala	Gly	Ala	Tyr	Ile	Phe	Ser	Ser	Glu	Thr	Gly	Gln	Gly	His	Leu	
				1860					1865					1870	
caa	cag	aaa	tca	gta	cgt	caa	tgt	aaa	cta	caa	gaa	cct	ata	ttg	5682
Gln	Gln	Lys	Ser	Val	Arg	Gln	Cys	Lys	Leu	Gln	Glu	Pro	Ile	Leu	
				1875					1880					1885	
gat	cgg	gcc	gtc	cat	gag	aag	tat	tac	gcc	ccg	cgc	ctc	gat	ctc	5727
Asp	Arg	Ala	Val	His	Glu	Lys	Tyr	Tyr	Ala	Pro	Arg	Leu	Asp	Leu	
				1890					1895					1900	
gaa	aga	gag	aaa	atg	tta	cag	aag	aaa	ctg	caa	tta	tgc	gcc	tct	5772
Glu	Arg	Glu	Lys	Met	Leu	Gln	Lys	Lys	Leu	Gln	Leu	Cys	Ala	Ser	
				1905					1910					1915	
gaa	gga	aat	aga	agc	agg	tat	caa	tca	cga	aaa	gta	gaa	aat	atg	5817
Glu	Gly	Asn	Arg	Ser	Arg	Tyr	Gln	Ser	Arg	Lys	Val	Glu	Asn	Met	
				1920					1925					1930	
aaa	gca	att	aca	gcg	gag	cga	ctc	att	tct	gga	ttg	ggc	aca	tat	5862
Lys	Ala	Ile	Thr	Ala	Glu	Arg	Leu	Ile	Ser	Gly	Leu	Gly	Thr	Tyr	
				1935					1940					1945	
cta	tca	tca	gaa	gtg	aat	cct	gtc	gag	tgt	tac	aga	gtc	aat	tat	5907
Leu	Ser	Ser	Glu	Val	Asn	Pro	Val	Glu	Cys	Tyr	Arg	Val	Asn	Tyr	
				1950					1955					1960	
cct	gta	cca	atc	tac	tcg	tca	acg	gta	att	aac	agg	ttt	aca	tct	5952
Pro	Val	Pro	Ile	Tyr	Ser	Ser	Thr	Val	Ile	Asn	Arg	Phe	Thr	Ser	
				1965					1970					1975	
gca	gag	gtc	gcg	gtt	aaa	acg	tgc	aac	tta	gtt	atc	caa	gag	aat	5997
Ala	Glu	Val	Ala	Val	Lys	Thr	Cys	Asn	Leu	Val	Ile	Gln	Glu	Asn	
				1980					1985					1990	

tac Tyr	cct Pro	aca Thr	gta Val	gcc Ala 1995	agt Ser	tat Tyr	tgt Cys	ata Ile	aca Thr 2000	gat Asp	gaa Glu	tac Tyr	gat Asp	gcg Ala 2005	6042
tat Tyr	ctt Leu	gac Asp	atg Met	gtg Val 2010	gac Asp	ggc Gly	gca Ala	tcg Ser	tgc Cys 2015	tgt Cys	cta Leu	gat Asp	aca Thr	gcc Ala 2020	6087
act Thr	ttt Phe	tgt Cys	ccg Pro	gct Ala 2025	aaa Lys	ctg Leu	aga Arg	agc Ser	tac Tyr 2030	cca Pro	aag Lys	aag Lys	cat His	agc Ser 2035	6132
tat Tyr	ttg Leu	cag Gln	cca Pro	gag Glu 2040	ata Ile	aga Arg	tca Ser	gcc Ala	gtc Val 2045	cca Pro	tcg Ser	cct Pro	ata Ile	cag Gln 2050	6177
aat Asn	aca Thr	tta Leu	caa Gln	aat Asn 2055	gta Val	ttg Leu	gct Ala	gca Ala	gct Ala 2060	act Thr	aaa Lys	agg Arg	aat Asn	tgc Cys 2065	6222
aac Asn	gtt Val	acc Thr	caa Gln	atg Met 2070	cga Arg	gaa Glu	tta Leu	cct Pro	gtc Val 2075	tta Leu	gat Asp	tcg Ser	gcg Ala	gca Ala 2080	6267
ttt Phe	aat Asn	gtt Val	gat Asp	tgt Cys 2085	ttc Phe	aag Lys	aaa Lys	tac Tyr	gca Ala 2090	tgc Cys	aat Asn	gat Asp	gag Glu	tac Tyr 2095	6312
tgg Trp	gat Asp	acc Thr	ttt Phe	cgc Arg 2100	gat Asp	aac Asn	cct Pro	att Ile	cgg Arg 2105	cta Leu	act Thr	aca Thr	gag Glu	aac Asn 2110	6357
gtt Val	acg Thr	caa Gln	tat Tyr	gtg Val 2115	aca Thr	aag Lys	ctg Leu	aaa Lys	ggg Gly 2120	ccg Pro	aaa Lys	gca Ala	gca Ala	gca Ala 2125	6402
ttg Leu	ttt Phe	gcg Ala	aat Asn	act Thr 2130	cat His	aat Asn	cta Leu	aaa Lys	ccg Pro 2135	ttg Leu	cag Gln	gag Glu	ata Ile	cca Pro 2140	6447
atg Met	gat Asp	caa Gln	ttc Phe	gtc Val 2145	atg Met	gat Asp	cta Leu	aag Lys	aga Arg 2150	gat Asp	gtc Val	aaa Lys	gtt Val	act Thr 2155	6492
ccc Pro	ggc Gly	acg Thr	aaa Lys	cat His 2160	aca Thr	gag Glu	gag Glu	cgg Arg	cct Pro 2165	aag Lys	gtg Val	cag Gln	gtt Val	att Ile 2170	6537
cag Gln	gct Ala	gca Ala	gat Asp	ccc Pro 2175	ctt Leu	gct Ala	acc Thr	gct Ala	tac Tyr 2180	ctt Leu	tgc Cys	ggg Gly	atc Ile	cat His 2185	6582
cgg Arg	gaa Glu	tta Leu	gtc Val	cgt Arg 2190	aga Arg	ctg Leu	aat Asn	gcg Ala	gtg Val 2195	ctt Leu	ctg Leu	cca Pro	aat Asn	atc Ile 2200	6627
cat His	act Thr	ctc Leu	ttc Phe	gac Asp 2205	atg Met	tca Ser	gcg Ala	gaa Glu	gat Asp 2210	ttt Phe	gat Asp	gcg Ala	att Ile	att Ile 2215	6672
gct Ala	gaa Glu	cat His	ttc Phe	cac His 2220	cac His	ggc Gly	gac Asp	cca Pro	gta Val 2225	ttg Leu	gaa Glu	acg Thr	gac Asp	atc Ile 2230	6717
gcg Ala	tcg Ser	ttt Phe	gat Asp	aaa Lys 2235	agc Ser	gaa Glu	gac Asp	gac Asp	gct Ala 2240	atc Ile	gcc Ala	att Ile	tcg Ser	gcg Ala 2245	6762
ttg Tyr	atg Tyr	atc Tyr	ctt Tyr	gag Tyr	gac Tyr	tta Tyr	ggt Tyr	gtc Tyr	gac Tyr 9	caa Tyr	ccg Tyr	ctc Tyr	tta Tyr	gat Tyr	6807

Leu	Met	Ile	Leu	Glu	Asp	Leu	Gly	Val	Asp	Gln	Pro	Leu	Leu	Asp	
				2250					2255					2260	
ttg	ata	gag	gcg	gcg	ttc	ggc	aat	atc	aca	tct	gtg	cac	cta	cct	6852
Leu	Ile	Glu	Ala	Ala	Phe	Gly	Asn	Ile	Thr	Ser	Val	His	Leu	Pro	
				2265					2270					2275	
aca	gga	acg	agg	ttt	aaa	ttt	ggt	gcc	atg	atg	aaa	tcc	ggt	atg	6897
Thr	Gly	Thr	Arg	Phe	Lys	Phe	Gly	Ala	Met	Met	Lys	Ser	Gly	Met	
				2280					2285					2290	
ttc	tta	acg	ctg	ttt	gtc	aac	aca	cta	gtc	aat	atc	atg	att	gct	6942
Phe	Leu	Thr	Leu	Phe	Val	Asn	Thr	Leu	Val	Asn	Ile	Met	Ile	Ala	
				2295					2300					2305	
agc	aga	gta	cta	cgt	gaa	cgg	tta	acc	acg	tca	gcg	tgc	gcg	gcc	6987
Ser	Arg	Val	Leu	Arg	Glu	Arg	Leu	Thr	Thr	Ser	Ala	Cys	Ala	Ala	
				2310					2315					2320	
tct	atc	ggc	gac	gat	aac	ata	gtg	cat	ggt	gtc	gtc	tcc	gac	acc	7032
Ser	Ile	Gly	Asp	Asp	Asn	Ile	Val	His	Gly	Val	Val	Ser	Asp	Thr	
				2325					2330					2335	
ttg	atg	gcg	gag	aga	tgc	gcc	act	tgg	ctg	aac	atg	gaa	gta	aaa	7077
Leu	Met	Ala	Glu	Arg	Cys	Ala	Thr	Trp	Leu	Asn	Met	Glu	Val	Lys	
				2340					2345					2350	
att	att	gat	gca	gtt	att	ggt	atc	aaa	gca	ccc	tac	ttc	tgt	ggg	7122
Ile	Ile	Asp	Ala	Val	Ile	Gly	Ile	Lys	Ala	Pro	Tyr	Phe	Cys	Gly	
				2355					2360					2365	
gga	ttt	atc	ctg	gtg	gac	cag	ata	aca	ggc	aca	gcc	tgc	aga	gtc	7167
Gly	Phe	Ile	Leu	Val	Asp	Gln	Ile	Thr	Gly	Thr	Ala	Cys	Arg	Val	
				2370					2375					2380	
gca	gac	cct	cta	aaa	agg	ctt	ttt	aag	ctt	gga	aaa	cca	ttg	cca	7212
Ala	Asp	Pro	Leu	Lys	Arg	Leu	Phe	Lys	Leu	Gly	Lys	Pro	Leu	Pro	
				2385					2390					2395	
gtc	gat	gat	acc	caa	gac	tgc	gac	cgc	cgc	cgg	gca	ctg	cat	gat	7257
Val	Asp	Asp	Thr	Gln	Asp	Cys	Asp	Arg	Arg	Arg	Ala	Leu	His	Asp	
				2400					2405					2410	
gaa	gca	atg	cga	tgg	aac	aga	att	gga	att	acg	gac	gag	tta	gtg	7302
Glu	Ala	Met	Arg	Trp	Asn	Arg	Ile	Gly	Ile	Thr	Asp	Glu	Leu	Val	
				2415					2420					2425	
aag	gcc	gta	gaa	tcc	aga	tac	gag	atc	ata	ctg	gca	ggc	ctg	atc	7347
Lys	Ala	Val	Glu	Ser	Arg	Tyr	Glu	Ile	Ile	Leu	Ala	Gly	Leu	Ile	
				2430					2435					2440	
atc	acg	tct	ctg	tcc	acg	tta	gcc	gaa	agc	gtt	aag	aac	ttc	aag	7392
Ile	Thr	Ser	Leu	Ser	Thr	Leu	Ala	Glu	Ser	Val	Lys	Asn	Phe	Lys	
				2445					2450					2455	
agc	ata	aga	ggg	agc	cca	atc	acc	ctc	tac	ggc	tga	cctaaatagg			7438
Ser	Ile	Arg	Gly	Ser	Pro	Ile	Thr	Leu	Tyr	Gly					
				2460					2465						
tgacgtagta	gacacgcacc	tacccaccgg	caga	atg	ttt	cca	tac	cct	cag						7490
				Met	Phe	Pro	Tyr	Pro	Gln						
									2470						
ctg	aac	ttt	cca	cca	gtt	tac	cct	aca	aat	ccg	atg	gct	tac	cga	7535
Leu	Asn	Phe	Pro	Pro	Val	Tyr	Pro	Thr	Asn	Pro	Met	Ala	Tyr	Arg	
				2475					2480						
gat	cca	aac	cct	cct	agg	cgc	cgc	tgg	agg	ccg	ttt	cgg	ccc	ccg	7580
Asp	Pro	Asn	Pro	Pro	Arg	Arg	Arg	Trp	Arg	Pro	Phe	Arg	Pro	Pro	

2490							2495							2500							
ctg	gct	gct	caa	atc	gaa	gat	ctt	agg	agg	tcg	ata	gtc	aac	ttg							7625
Leu	Ala	Ala	Gln	Ile	Glu	Asp	Leu	Arg	Arg	Ser	Ile	Val	Asn	Leu							
		2505					2510					2515									
act	ttc	aaa	caa	cga	tca	cct	aat	ccg	ccg	cca	ggt	cca	ccg	cca							7670
Thr	Phe	Lys	Gln	Arg	Ser	Pro	Asn	Pro	Pro	Pro	Gly	Pro	Pro	Pro							
		2520					2525					2530									
aag	aag	aag	aag	agt	gct	cct	aag	cca	aaa	cct	act	cag	cct	aaa							7715
Lys	Lys	Lys	Lys	Ser	Ala	Pro	Lys	Pro	Lys	Pro	Thr	Gln	Pro	Lys							
		2535					2540					2545									
aag	aag	aag	cag	caa	gcc	aag	agg	acg	aaa	cgc	aag	cct	aaa	cca							7760
Lys	Lys	Lys	Gln	Gln	Ala	Lys	Arg	Thr	Lys	Arg	Lys	Pro	Lys	Pro							
		2550					2555					2560									
ggg	aaa	cga	caa	cgt	atg	tgt	atg	aag	ttg	gag	tcg	gac	aag	aca							7805
Gly	Lys	Arg	Gln	Arg	Met	Cys	Met	Lys	Leu	Glu	Ser	Asp	Lys	Thr							
		2565					2570					2575									
ttt	ccg	atc	atg	ctg	aac	ggc	caa	gtg	aat	gga	tat	gcc	tgc	gtt							7850
Phe	Pro	Ile	Met	Leu	Asn	Gly	Gln	Val	Asn	Gly	Tyr	Ala	Cys	Val							
		2580					2585					2590									
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Val	Gly	Gly	Arg	Leu	Met	Lys	Pro	Leu	His	Val	Glu	Gly	Lys	Ile							
		2595					2600					2605									
gat	aat	gag	caa	tta	gcg	gcc	gtg	aaa	ttg	aag	aag	gct	agc	atg							7940
Asp	Asn	Glu	Gln	Leu	Ala	Ala	Val	Lys	Leu	Lys	Lys	Ala	Ser	Met							
		2610					2615					2620									
tac	gac	ttg	gag	tac	ggc	gac	gtt	ccc	cag	aac	atg	aaa	tca	gac							7985
Tyr	Asp	Leu	Glu	Tyr	Gly	Asp	Val	Pro	Gln	Asn	Met	Lys	Ser	Asp							
		2625					2630					2635									
acg	ctg	cag	tac	acc	agc	gac	aaa	cca	ccg	ggc	ttc	tac	aac	tg							8030
Thr	Leu	Gln	Tyr	Thr	Ser	Asp	Lys	Pro	Pro	Gly	Phe	Tyr	Asn	Trp							
		2640					2645					2650									
cac	cac	ggc	gca	gtc	cag	tat	gag	aat	ggg	aga	ttt	acc	gta	ccg							8075
His	His	Gly	Ala	Val	Gln	Tyr	Glu	Asn	Gly	Arg	Phe	Thr	Val	Pro							
		2655					2660					2665									
aga	gga	gtg	ggc	ggg	aaa	ggc	gac	agc	gga	aga	ccg	atc	ctg	gac							8120
Arg	Gly	Val	Gly	Gly	Lys	Gly	Asp	Ser	Gly	Arg	Pro	Ile	Leu	Asp							
		2670					2675					2680									
aac	aga	ggc	aga	gtt	gtg	gct	att	gtt	cta	gga	ggt	gca	aat	gag							8165
Asn	Arg	Gly	Arg	Val	Val	Ala	Ile	Val	Leu	Gly	Gly	Ala	Asn	Glu							
		2685					2690					2695									
ggc	acg	cgt	acg	gcg	ctt	tca	gtg	gtc	act	tg	aac	cag	aaa	ggg							8210
Gly	Thr	Arg	Thr	Ala	Leu	Ser	Val	Val	Thr	Trp	Asn	Gln	Lys	Gly							
		2700					2705					2710									
gtg	acc	att	agg	gat	acc	ccc	gaa	ggt	tct	gaa	ccg	tg	tca	cta							8255
Val	Thr	Ile	Arg	Asp	Thr	Pro	Glu	Gly	Ser	Glu	Pro	Trp	Ser	Leu							
		2715					2720					2725									
gtt	aca	gcg	cta	tgc	gtg	ctt	tcg	aat	gtc	acg	ttc	cca	tgc	gac							8300
Val	Thr	Ala	Leu	Cys	Val	Leu	Ser	Asn	Val	Thr	Phe	Pro	Cys	Asp							
		2730					2735					2740									
aaa	cca	ccc	gtg	tgc	tat	tca	ctg	acg	cca	gaa	cga	aca	ctc	gac							8345
Lys	Pro	Pro	Val	Cys	Tyr	Ser	Leu	Thr	Pro	Glu	Arg	Thr	Leu	Asp							
		2745					2750					2755									

gtg	ctc	gaa	gag	aac	gtc	gac	aat	cca	aat	tac	gac	acg	ctg	ctg	8390
Val	Leu	Glu	Glu	Asn	Val	Asp	Asn	Pro	Asn	Tyr	Asp	Thr	Leu	Leu	
		2760					2765					2770			
gag	aac	gtc	ttg	aaa	tgt	cca	tca	cgc	cgg	ccc	aaa	cga	agc	att	8435
Glu	Asn	Val	Leu	Lys	Cys	Pro	Ser	Arg	Arg	Pro	Lys	Arg	Ser	Ile	
		2775					2780					2785			
acc	gat	gac	ttc	aca	ctg	acc	agt	ccc	tac	ctg	ggg	ttc	tgc	ccg	8480
Thr	Asp	Asp	Phe	Thr	Leu	Thr	Ser	Pro	Tyr	Leu	Gly	Phe	Cys	Pro	
		2790					2795					2800			
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Tyr	Cys	Arg	His	Ser	Thr	Pro	Cys	Phe	Ser	Pro	Ile	Lys	Ile	Glu	
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Asn	Val	Trp	Asp	Glu	Ser	Asp	Asp	Gly	Ser	Ile	Arg	Ile	Gln	Val	
		2820					2825					2830			
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Ser	Ala	Gln	Phe	Gly	Tyr	Asn	Gln	Ala	Gly	Thr	Ala	Asp	Val	Thr	
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Lys	Phe	Arg	Tyr	Met	Ser	Phe	Asp	His	Asp	His	Asp	Ile	Lys	Glu	
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Asp	Ser	Met	Glu	Lys	Ile	Ala	Ile	Ser	Thr	Ser	Gly	Pro	Cys	Arg	
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Arg	Leu	Gly	His	Lys	Gly	Tyr	Phe	Leu	Leu	Ala	Gln	Cys	Pro	Pro	
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Gly	Asp	Ser	Val	Thr	Val	Ser	Ile	Thr	Ser	Gly	Ala	Ser	Glu	Asn	
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Ser	Cys	Thr	Val	Glu	Lys	Lys	Ile	Arg	Arg	Lys	Phe	Val	Gly	Arg	
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Glu	Glu	Tyr	Leu	Phe	Pro	Pro	Val	His	Gly	Lys	Leu	Val	Lys	Cys	
		2925					2930					2935			
cac	gtt	tac	gat	cac	ttg	aag	gag	acg	tct	gcc	ggg	tac	ata	acc	8930
His	Val	Tyr	Asp	His	Leu	Lys	Glu	Thr	Ser	Ala	Gly	Tyr	Ile	Thr	
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Met	His	Arg	Pro	Gly	Pro	His	Ala	Tyr	Lys	Ser	Tyr	Leu	Glu	Glu	
		2955					2960					2965			
gcg	tca	ggc	gaa	gtg	tac	att	aaa	cca	cct	tct	ggc	aag	aac	gtc	9020
Ala	Ser	Gly	Glu	Val	Tyr	Ile	Lys	Pro	Pro	Ser	Gly	Lys	Asn	Val	
		2970					2975					2980			
acc	tac	gaa	tgt	aag	tgt	ggc	gac	tac	agc	aca	ggt	atc	gtg	agc	9065
Thr	Tyr	Glu	Cys	Lys	Cys	Gly	Asp	Tyr	Ser	Thr	Gly	Ile	Val	Ser	
		2985					2990					2995			
acg	cga	acg	aag	atg	aac	ggc	tgc	act	aaa	gca	aaa	cag	tgc	att	9110
Thr	Arg	Thr	Lys	Met	Asn	Gly	Cys	Thr	Lys	Ala	Lys	Gln	Cys	Ile	
		3000					3005					3010			

gcc Ala	tac Tyr	aag Lys 3015	agc Ser	gac Asp	caa Gln	acg Thr	aaa Lys 3020	tgg Trp	gtc Val	ttc Phe	aac Asn	tcg Ser 3025	ccg Pro	gat Asp	9155
ctt Leu	att Ile	agg Arg 3030	cac His	aca Thr	gac Asp	cac His	tca Ser 3035	gtg Val	caa Gln	ggt Gly	aaa Lys	ttg Leu 3040	cac His	att Ile	9200
cca Pro	ttc Phe	cgc Arg 3045	ttg Leu	aca Thr	ccg Pro	aca Thr	gtc Val 3050	tgc Cys	ccg Pro	gtt Val	ccg Pro	tta Leu 3055	gct Ala	cac His	9245
acg Thr	cct Pro	aca Thr 3060	gtc Val	acg Thr	aag Lys	tgg Trp	ttc Phe 3065	aaa Lys	ggc Gly	atc Ile	acc Thr	ctc Leu 3070	cac His	ctg Leu	9290
act Thr	gca Ala	atg Met 3075	cga Arg	cca Pro	aca Thr	ttg Leu	ctg Leu 3080	aca Thr	acg Thr	aga Arg	aaa Lys	ttg Leu 3085	ggg Gly	ctg Leu	9335
cga Arg	gca Ala	gac Asp 3090	gca Ala	aca Thr	gca Ala	gaa Glu	tgg Trp 3095	att Ile	aca Thr	ggg Gly	tct Ser	aca Thr 3100	tcc Ser	agg Arg	9380
aat Asn	ttt Phe	tct Ser 3105	gtg Val	ggg Gly	cga Arg	gaa Glu	ggg Gly 3110	ctg Leu	gag Glu	tac Tyr	gta Val	tgg Trp 3115	ggg Gly	aac Asn	9425
cat His	gaa Glu	cca Pro 3120	gtc Val	aga Arg	gtc Val	tgg Trp	gcc Ala 3125	cag Gln	gag Glu	tcg Ser	gca Ala	cca Pro 3130	ggc Gly	gac Asp	9470
cca Pro	cat His	gga Gly 3135	tgg Trp	ccg Pro	cat His	gag Glu	atc Ile 3140	atc Ile	atc Ile	cac His	tat Tyr	tat Tyr 3145	cat His	cgg Arg	9515
cat His	cca Pro	gtc Val 3150	tac Tyr	act Thr	gtc Val	att Ile	gtg Val 3155	ctg Leu	tgt Cys	ggt Gly	gtc Val	gct Ala 3160	ctt Leu	gct Ala	9560
atc Ile	ctg Leu	gta Val 3165	ggc Gly	act Thr	gca Ala	tca Ser	tca Ser 3170	gca Ala	gct Ala	tgc Cys	atc Ile	gcc Ala 3175	aaa Lys	gca Ala	9605
aga Arg	aga Arg	gac Asp 3180	tgc Cys	ctg Leu	acg Thr	cca Pro	tac Tyr 3185	gcg Ala	ctt Leu	gca Ala	ccg Pro	aac Asn 3190	gca Ala	acg Thr	9650
gta Val	ccc Pro	aca Thr 3195	gca Ala	tta Leu	gcg Ala	gtt Val	ttg Leu 3200	tgc Cys	tgc Cys	att Ile	cgg Arg	cca Pro 3205	acc Thr	aac Asn	9695
gct Ala	gaa Glu	aca Thr 3210	ttt Phe	gga Gly	gaa Glu	act Thr	ttg Leu 3215	aac Asn	cat His	ctg Leu	tgg Trp	ttt Phe 3220	aac Asn	aac Asn	9740
caa Gln	ccg Pro	ttt Phe 3225	ctc Leu	tgg Trp	gca Ala	cag Gln	ttg Leu 3230	tgc Cys	att Ile	cct Pro	ctg Leu	gca Ala 3235	gcg Ala	ctt Leu	9785
gtt Val	att Ile	ctg Leu 3240	ttc Phe	cgc Arg	tgc Cys	ttt Phe	tca Ser 3245	tgc Cys	tgc Cys	atg Met	cct Pro	ttt Phe 3250	tta Leu	ttg Leu	9830
gtt Val	gca Ala	ggc Gly 3255	gtc Val	tgc Cys	ctg Leu	ggg Gly	aag Lys 3260	gta Val	gac Asp	gcc Ala	ttc Phe	gaa Glu 3265	cat His	gcg Ala	9875
acc Act	act Act	gtg Gly	cca Pro	aat Asn	gtt Val	ccg Gly	ggg Gly	atc Trp	ccg Gly	tat Tyr	aag Arg	gcg Gly	ttg Val	gtc Gly	9920

Thr	Thr	Val 3270	Pro	Asn	Val	Pro	Gly 3275	Ile	Pro	Tyr	Lys	Ala 3280	Leu	Val	
gaa Glu	cgc Arg	gca Ala 3285	ggt Gly	tac Tyr	gcg Ala	cca Pro	ctt Leu 3290	aac Asn	ctg Leu	gag Glu	atc Ile	acg Thr 3295	gtc Val	gtc Val	9965
tca Ser	tcg Ser	gaa Glu 3300	tta Leu	aca Thr	cct Pro	tca Ser	act Thr 3305	aac Asn	aag Lys	gag Glu	tac Tyr	gtg Val 3310	acc Thr	tgc Cys	10010
aaa Lys	ttc Phe	cac His 3315	aca Thr	gtc Val	att Ile	cct Pro	tca Ser 3320	cca Pro	caa Gln	gtt Val	aaa Lys	tgc Cys 3325	tgc Cys	ggg Gly	10055
tcc Ser	ctc Leu	gag Glu 3330	tgc Cys	aag Lys	gca Ala	tcc Ser	tca Ser 3335	aag Lys	gcg Ala	gat Asp	tac Tyr	aca Thr 3340	tgc Cys	cgc Arg	10100
gtt Val	ttt Phe	ggc Gly 3345	ggt Gly	gtg Val	tac Tyr	cct Pro	ttc Phe 3350	atg Met	tgg Trp	gga Gly	ggc Gly	gca Ala 3355	caa Gln	tgc Cys	10145
ttc Phe	tgt Cys	gac Asp 3360	agt Ser	gag Glu	aac Asn	aca Thr	caa Gln 3365	ctg Leu	agt Ser	gag Glu	gcg Ala	tac Tyr 3370	gtc Val	gag Glu	10190
ttc Phe	gct Ala	cca Pro 3375	gac Asp	tgc Cys	act Thr	ata Ile	gat Asp 3380	cac His	gca Ala	gtc Val	gca Ala	cta Leu 3385	aaa Lys	gtt Val	10235
cac His	aca Thr	gct Ala 3390	gct Ala	ctg Leu	aaa Lys	gtc Val	ggc Gly 3395	ctg Leu	cgt Arg	ata Ile	gta Val	tac Tyr 3400	ggc Gly	aac Asn	10280
acc Thr	acc Thr	gcg Ala 3405	cac His	ctg Leu	gat Asp	acg Thr	ttt Phe 3410	gtc Val	aat Asn	ggc Gly	gtc Val	acg Thr 3415	cca Pro	ggt Gly	10325
tcc Ser	tca Ser	cgg Arg 3420	gac Asp	ctg Leu	aag Lys	gtc Val	ata Ile 3425	gca Ala	ggg Gly	ccg Pro	ata Ile	tca Ser 3430	gcc Ala	gct Ala	10370
ttt Phe	tca Ser	ccc Pro 3435	ttt Phe	gac Asp	cat His	aag Lys	gtc Val 3440	gtc Val	atc Ile	aga Arg	aag Lys	ggg Gly 3445	ctt Leu	gtt Val	10415
tac Tyr	aac Asn	tac Tyr 3450	gac Asp	ttc Phe	cct Pro	gag Glu	tat Tyr 3455	gga Gly	gct Ala	atg Met	aaa Lys	cca Pro 3460	gga Gly	gcg Ala	10460
ttc Phe	ggc Gly	gat Asp 3465	att Ile	caa Gln	gca Ala	tcc Ser	tcg Ser 3470	ctt Leu	gat Asp	gct Ala	aca Thr	gac Asp 3475	ata Ile	gta Val	10505
gcc Ala	cgc Arg	act Thr 3480	gac Asp	ata Ile	cgg Arg	ctg Leu	ctg Leu 3485	aag Lys	cct Pro	tct Ser	gtc Val	aag Lys 3490	aac Asn	atc Ile	10550
cac His	gtc Val	ccc Pro 3495	tac Tyr	acc Thr	caa Gln	gca Ala	gta Val 3500	tca Ser	ggg Gly	tat Tyr	gaa Glu	atg Met 3505	tgg Trp	aag Lys	10595
aac Asn	aac Asn	tca Ser 3510	gga Gly	cga Arg	ccc Pro	ctg Leu	caa Gln 3515	gaa Glu	aca Thr	gca Ala	cca Pro	ttt Phe 3520	gga Gly	tgt Cys	10640
aaa Lys	att Ile	gaa Glu	gtg Val	gag Glu	cct Pro	ctg Leu	cga Arg	gcg Ala	tct Ser	aac Asn	tgt Cys	gct Ala	tac Tyr	ggg Gly	10685

3525	3530	3535	
cac atc cct His Ile Pro 3540	atc tcg att gac Ile Ser Ile Asp 3545	cct gat gca gct Pro Asp Ala Ala 3550	ttt gtg aga Phe Val Arg 3550
tca tca gaa Ser Ser Glu 3555	tca cca aca att Ser Pro Thr Ile 3560	gaa gtt agc tgc Glu Val Ser Cys 3565	aca gta gca Thr Val Ala 3565
gac tgc att Asp Cys Ile 3570	tat tct gca gac Tyr Ser Ala Asp 3575	ttt ggt ggt tct cta Phe Gly Gly Ser Leu 3580	aca tta cag Thr Leu Gln 3580
tac aaa gct Tyr Lys Ala 3585	gac agg gag gga Asp Arg Glu Gly 3590	cat tgt cca gtt cac His Cys Pro Val His 3595	tcc cac tcc Ser His Ser 3595
acg aca gct Thr Thr Ala 3600	gtt ttg aag gaa Val Leu Lys Glu 3605	gcg acc aca cat gtg Ala Thr Thr His Val 3610	act gcc gta Thr Ala Val 3610
ggc agc ata Gly Ser Ile 3615	aca cta cat ttt Thr Leu His Phe 3620	agc aca tcg agc cca Ser Thr Ser Ser Pro 3625	caa gca aat Gln Ala Asn 3625
ttt ata gtt Phe Ile Val 3630	tcg cta tgc ggc Ser Leu Cys Gly 3635	aag aag tcc acc tgc Lys Ser Thr Cys 3640	aat gct gaa Asn Ala Glu 3640
tgt aaa cca Cys Lys Pro 3645	ccg gcc gac cac Pro Ala Asp His 3650	ata att gga gaa cca Ile Ile Gly Glu Pro 3655	cat aaa gtc His Lys Val 3655
gac caa gaa Asp Gln Glu 3660	ttc cag gcg gca Phe Gln Ala Ala 3665	gtt tcc aaa aca tct Val Ser Lys Thr Ser 3670	tgg aac tgg Trp Asn Trp 3670
ctg ctt gca Leu Leu Ala 3675	ctg ttt ggg gga Leu Phe Gly Gly 3680	gca tca tcc ctc att Ala Ser Ser Leu Ile 3685	gtt gta gga Val Val Gly 3685
ctt ata gtg Leu Ile Val 3690	ttg gtc tgc agc Leu Val Cys Ser 3695	tct atg ctt ata aac Ser Met Leu Ile Asn 3700	aca cgt aga Thr Arg Arg 3700
tga ctgagcgcgg	acactgacat agcggtaaaa	ctcgatgtac ttccgaggaa	11233
gcgtggtgca	taatgccacg cgccgcttga	cactaaaact cgatgtat	11293
acagtgcata	atgctgtgca gtgtcacatt	aatcgtatat cacactacat	11353
ctatatcact	tttatgagac tcactatggg	tctctaatat acactacaca	11413
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ttttaaattt c			11484

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 <212> PRT
 <213> western equine encephalomyelitis virus - strain 71V-1658
 <400> 2

Met Glu Arg Ile His Val Asp Leu Asp Ala Asp Ser Pro Tyr Val Lys
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Ser Leu Gln Arg Thr Phe Pro Gln Phe Glu Ile Glu Ala Arg Gln Val
 20 25 30
 Thr Asp Asn Asp His Ala Asn Ala Arg Ala Phe Ser His Val Ala Thr
 35 40 45
 Lys Leu Ile Glu Ser Glu Val Asp Arg Asp Gln Val Ile Leu Asp Ile
 50 55 60
 Gly Ser Ala Pro Val Arg His Ala His Ser Asn His Arg Tyr His Cys
 65 70 75 80
 Ile Cys Pro Met Ile Ser Ala Glu Asp Pro Asp Arg Leu Gln Arg Tyr
 85 90 95
 Ala Glu Arg Leu Lys Lys Ser Asp Ile Thr Asp Lys Asn Ile Ala Ser
 100 105 110
 Lys Ala Ala Asp Leu Leu Glu Val Met Ser Thr Pro Asp Ala Glu Thr
 115 120 125
 Pro Ser Leu Cys Met His Thr Asp Ala Thr Cys Arg Tyr Phe Gly Ser
 130 135 140
 Val Ala Val Tyr Gln Asp Val Tyr Ala Val His Ala Pro Thr Ser Ile
 145 150 155 160
 Tyr His Gln Ala Leu Lys Gly Val Arg Thr Ile Tyr Trp Ile Gly Phe
 165 170 175
 Asp Thr Thr Pro Phe Met Tyr Lys Asn Met Ala Gly Ser Tyr Pro Thr
 180 185 190
 Tyr Asn Thr Asn Trp Ala Asp Glu Arg Val Leu Glu Ala Arg Asn Ile
 195 200 205
 Gly Leu Gly Asn Ser Asp Leu Gln Glu Ser Arg Leu Gly Lys Leu Ser
 210 215 220
 Ile Leu Arg Lys Lys Arg Leu Gln Pro Thr Asn Lys Ile Ile Phe Ser
 225 230 235 240
 Val Gly Ser Thr Ile Tyr Thr Glu Asp Arg Ser Leu Leu Arg Ser Trp
 245 250 255
 His Leu Pro Asn Val Phe His Leu Lys Gly Lys Ser Asn Phe Thr Gly
 260 265 270
 Arg Cys Gly Thr Ile Val Ser Cys Glu Gly Tyr Val Ile Lys Lys Ile
 275 280 285

Thr Ile Ser Pro Gly Leu Tyr Gly Lys Val Glu Asn Leu Ala Ser Thr
 290 295 300

Met His Arg Glu Gly Phe Leu Ser Cys Lys Val Thr Asp Thr Leu Arg
 305 310 315 320

Gly Glu Arg Val Ser Phe Ala Val Cys Thr Tyr Val Pro Ala Thr Leu
 325 330 335

Cys Asp Gln Met Thr Gly Ile Leu Ala Thr Asp Val Ser Val Asp Asp
 340 345 350

Ala Gln Lys Leu Leu Val Gly Leu Asn Gln Arg Ile Val Val Asn Gly
 355 360 365

Arg Thr Gln Arg Asn Thr Asn Thr Met Gln Asn Tyr Leu Leu Pro Val
 370 375 380

Val Ala Gln Ala Phe Ser Arg Trp Ala Arg Glu His Arg Ala Asp Leu
 385 390 395 400

Asp Asp Glu Lys Glu Leu Gly Val Arg Glu Arg Thr Leu Thr Met Gly
 405 410 415

Cys Cys Trp Ala Phe Lys Thr Gln Lys Ile Thr Ser Ile Tyr Lys Lys
 420 425 430

Pro Gly Thr Gln Thr Ile Lys Lys Val Pro Ala Val Phe Asp Ser Phe
 435 440 445

Val Ile Pro Arg Leu Thr Ser His Gly Leu Asp Met Gly Phe Arg Arg
 450 455 460

Arg Leu Lys Leu Leu Leu Glu Pro Thr Val Lys Pro Ala Pro Ala Ile
 465 470 475 480

Thr Met Ala Asp Val Glu His Leu Arg Gly Leu Gln Gln Glu Ala Glu
 485 490 495

Glu Val Ala Ala Ala Glu Glu Ile Arg Glu Ala Leu Pro Pro Leu Leu
 500 505 510

Pro Glu Ile Glu Lys Glu Thr Val Glu Ala Glu Val Asp Leu Ile Met
 515 520 525

Gln Glu Ala Gly Ala Gly Ser Val Glu Thr Pro Arg Gly His Ile Arg
 530 535 540

Val Thr Ser Tyr Pro Gly Glu Glu Lys Ile Gly Ser Tyr Ala Ile Leu
 545 550 555 560

Ser Pro Gln Ala Val Leu Asn Ser Glu Lys Leu Ala Cys Ile His Pro
 17

Val Thr Ala Ile Val Ser Thr Leu Phe Tyr Asp Lys Arg Met Lys Thr
 850 855 860
 Val Asn Pro Cys Ala Asp Lys Ile Ile Ile Asp Thr Thr Gly Thr Thr
 865 870 875 880
 Lys Pro His Lys Asp Asp Leu Ile Leu Thr Cys Phe Arg Gly Trp Val
 885 890 895
 Lys Gln Leu Gln Ile Asp Tyr Lys Asn His Glu Ile Met Thr Ala Ala
 900 905 910
 Ala Ser Gln Gly Leu Thr Arg Lys Gly Val Tyr Ala Val Arg Tyr Lys
 915 920 925
 Val Asn Glu Asn Pro Leu Tyr Ser Gln Thr Ser Glu His Val Asn Val
 930 935 940
 Leu Leu Thr Arg Thr Glu Lys Arg Ile Val Trp Lys Thr Leu Ala Gly
 945 950 955 960
 Asp Pro Trp Ile Lys Thr Leu Thr Ala Lys Tyr Pro Gly Asp Phe Thr
 965 970 975
 Ala Ser Leu Asp Asp Trp Gln Arg Glu His Asp Ala Ile Met Ala Arg
 980 985 990
 Val Leu Asp Lys Pro Gln Thr Ala Asp Val Phe Gln Asn Lys Val Asn
 995 1000 1005
 Val Cys Trp Ala Lys Ala Leu Glu Pro Val Leu Ala Thr Ala Asn
 1010 1015 1020
 Ile Val Leu Thr Arg Gln Gln Trp Glu Thr Leu His Pro Phe Lys
 1025 1030 1035
 His Asp Arg Ala Tyr Ser Pro Glu Met Ala Leu Asn Phe Phe Cys
 1040 1045 1050
 Thr Arg Phe Phe Gly Val Asp Leu Asp Ser Gly Leu Phe Ser Ala
 1055 1060 1065
 Pro Thr Val Ala Leu Thr Tyr Arg Asp Gln His Trp Asp Asn Ser
 1070 1075 1080
 Pro Gly Lys Asn Met Tyr Gly Leu Asn Arg Glu Val Ala Lys Glu
 1085 1090 1095
 Leu Ser Arg Arg Tyr Pro Cys Ile Thr Lys Ala Val Asp Thr Gly
 1100 1105 1110

Arg Val 1115	Ala Asp Ile Arg	Asn 1120	Asn Thr Ile Lys	Asp 1125	Tyr Ser Pro
Thr Ile 1130	Asn Val Val Pro	Leu 1135	Asn Arg Arg Leu	Pro 1140	His Ser Leu
Ile Val 1145	Asp His Lys Gly	Gln 1150	Gly Thr Thr Asp	His 1155	Ser Gly Phe
Leu Ser 1160	Lys Met Lys Gly	Lys 1165	Ser Val Leu Val	Ile 1170	Gly Asp Pro
Ile Ser 1175	Ile Pro Gly Lys	Lys 1180	Val Glu Ser Met	Gly 1185	Pro Leu Pro
Thr Asn 1190	Thr Ile Arg Cys	Asp 1195	Leu Asp Leu Gly	Ile 1200	Pro Ser His
Val Gly 1205	Lys Tyr Asp Ile	Ile 1210	Phe Val Asn Val	Arg 1215	Thr Pro Tyr
Arg Asn 1220	His His Tyr Gln	Gln 1225	Cys Glu Asp His	Ala 1230	Ile His His
Ser Met 1235	Leu Thr Cys Lys	Ala 1240	Val His His Leu	Asn 1245	Thr Gly Gly
Thr Cys 1250	Val Ala Ile Gly	Tyr 1255	Gly Leu Ala Asp	Arg 1260	Ala Thr Glu
Asn Ile 1265	Ile Thr Ala Val	Ala 1270	Arg Ser Phe Arg	Phe 1275	Thr Arg Val
Cys Gln 1280	Pro Lys Asn Thr	Ala 1285	Glu Asn Thr Glu	Val 1290	Leu Phe Val
Phe Phe 1295	Gly Lys Asp Asn	Gly 1300	Asn His Thr His	Asp 1305	Gln Asp Arg
Leu Gly 1310	Val Val Leu Asp	Asn 1315	Ile Tyr Gln Gly	Ser 1320	Thr Arg Tyr
Glu Ala 1325	Gly Arg Ala Pro	Ala 1330	Tyr Arg Val Ile	Arg 1335	Gly Asp Ile
Ser Lys 1340	Ser Ala Asp Gln	Ala 1345	Ile Val Asn Ala	Ala 1350	Asn Ser Lys
Gly Gln 1355	Pro Gly Ser Gly	Val 1360	Cys Gly Ala Leu	Tyr 1365	Arg Lys Trp

Pro	Ala	Ala	Phe	Asp	Arg	Gln	Pro	Ile	Ala	Val	Gly	Thr	Ala	Arg
	1370					1375					1380			
Leu	Val	Lys	His	Glu	Pro	Leu	Ile	Ile	His	Ala	Val	Gly	Pro	Asn
	1385					1390					1395			
Phe	Ser	Lys	Met	Pro	Glu	Pro	Glu	Gly	Asp	Leu	Lys	Leu	Ala	Ala
	1400					1405					1410			
Ala	Tyr	Met	Ser	Ile	Ala	Ser	Ile	Val	Asn	Ala	Glu	Arg	Ile	Thr
	1415					1420					1425			
Lys	Ile	Ser	Val	Pro	Leu	Leu	Ser	Thr	Gly	Ile	Tyr	Ser	Gly	Gly
	1430					1435					1440			
Lys	Asp	Arg	Val	Met	Gln	Ser	Leu	His	His	Leu	Phe	Thr	Ala	Phe
	1445					1450					1455			
Asp	Thr	Thr	Asp	Ala	Asp	Val	Thr	Ile	Tyr	Cys	Leu	Asp	Lys	Gln
	1460					1465					1470			
Trp	Glu	Thr	Arg	Ile	Ile	Glu	Ala	Ile	His	Arg	Lys	Glu	Ser	Val
	1475					1480					1485			
Glu	Ile	Leu	Asp	Asp	Asp	Lys	Pro	Val	Asp	Ile	Asp	Leu	Val	Arg
	1490					1495					1500			
Val	His	Pro	Asn	Ser	Ser	Leu	Ala	Gly	Arg	Pro	Gly	Tyr	Ser	Val
	1505					1510					1515			
Asn	Glu	Gly	Lys	Leu	Tyr	Ser	Tyr	Leu	Glu	Gly	Thr	Arg	Phe	His
	1520					1525					1530			
Gln	Thr	Ala	Lys	Asp	Ile	Ala	Glu	Ile	His	Ala	Met	Trp	Pro	Asn
	1535					1540					1545			
Lys	Ser	Glu	Ala	Asn	Glu	Gln	Ile	Cys	Leu	Tyr	Ile	Leu	Gly	Glu
	1550					1555					1560			
Ser	Met	Ser	Ser	Ile	Arg	Ser	Lys	Cys	Pro	Val	Glu	Glu	Ser	Glu
	1565					1570					1575			
Ala	Ser	Ala	Pro	Pro	His	Thr	Leu	Pro	Cys	Leu	Cys	Asn	Tyr	Ala
	1580					1585					1590			
Met	Thr	Ala	Glu	Arg	Val	Tyr	Arg	Leu	Arg	Ser	Ala	Lys	Lys	Glu
	1595					1600					1605			
Gln	Phe	Ala	Val	Cys	Ser	Ser	Phe	Leu	Leu	Pro	Lys	Tyr	Arg	Ile
	1610					1615					1620			
Thr	Gly	Val	Gln	Lys	Leu	Gln	Cys	Ser	Lys	Pro	Val	Leu	Phe	Ser

1625		1630		1635
Gly Val Val Pro Pro Ala Val His Pro Arg Lys Tyr Ala Glu Ile	1640	1645	1650	
Ile Leu Glu Thr Pro Pro Pro Pro Ala Thr Thr Thr Val Ile Cys	1655	1660	1665	
Glu Pro Thr Val Pro Glu Arg Ile Pro Ser Pro Val Ile Ser Arg	1670	1675	1680	
Ala Pro Ser Ala Glu Ser Leu Leu Ser Leu Gly Gly Val Ser Phe	1685	1690	1695	
Ser Ser Ser Ala Thr Arg Ser Ser Thr Ala Trp Ser Asp Tyr Asp	1700	1705	1710	
Arg Arg Phe Val Val Thr Ala Asp Val His Gln Ala Asn Thr Ser	1715	1720	1725	
Thr Trp Ser Ile Pro Ser Ala Pro Gly Leu Asp Val Gln Leu Pro	1730	1735	1740	
Ser Asp Val Thr Asp Ser His Trp Ser Ile Pro Ser Ala Ser Gly	1745	1750	1755	
Phe Glu Val Arg Thr Pro Ser Val Gln Asp Leu Thr Ala Glu Cys	1760	1765	1770	
Ala Lys Pro Arg Gly Leu Ala Glu Ile Met Gln Asp Phe Asn Thr	1775	1780	1785	
Ala Pro Phe Gln Phe Leu Ser Asp Tyr Arg Pro Val Pro Ala Pro	1790	1795	1800	
Arg Arg Arg Pro Ile Pro Ser Pro Arg Ser Thr Ala Ser Ala Pro	1805	1810	1815	
Pro Val Pro Lys Pro Arg Arg Thr Lys Tyr Gln Gln Pro Pro Gly	1820	1825	1830	
Val Ala Arg Ala Ile Ser Glu Ala Glu Leu Asp Glu Tyr Ile Arg	1835	1840	1845	
Gln His Ser Asn	1850			

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 <213> Western equine encephalomyelitis virus - strain 71V-1658
 <400> 3

Arg Tyr Glu Ala Gly Ala Tyr Ile Phe Ser Ser Glu Thr Gly Gln Gly
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 His Leu Gln Gln Lys Ser Val Arg Gln Cys Lys Leu Gln Glu Pro Ile
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 Leu Asp Arg Ala Val His Glu Lys Tyr Tyr Ala Pro Arg Leu Asp Leu
 35 40 45
 Glu Arg Glu Lys Met Leu Gln Lys Lys Leu Gln Leu Cys Ala Ser Glu
 50 55 60
 Gly Asn Arg Ser Arg Tyr Gln Ser Arg Lys Val Glu Asn Met Lys Ala
 65 70 75 80
 Ile Thr Ala Glu Arg Leu Ile Ser Gly Leu Gly Thr Tyr Leu Ser Ser
 85 90 95
 Glu Val Asn Pro Val Glu Cys Tyr Arg Val Asn Tyr Pro Val Pro Ile
 100 105 110
 Tyr Ser Ser Thr Val Ile Asn Arg Phe Thr Ser Ala Glu Val Ala Val
 115 120 125
 Lys Thr Cys Asn Leu Val Ile Gln Glu Asn Tyr Pro Thr Val Ala Ser
 130 135 140
 Tyr Cys Ile Thr Asp Glu Tyr Asp Ala Tyr Leu Asp Met Val Asp Gly
 145 150 155 160
 Ala Ser Cys Cys Leu Asp Thr Ala Thr Phe Cys Pro Ala Lys Leu Arg
 165 170 175
 Ser Tyr Pro Lys Lys His Ser Tyr Leu Gln Pro Glu Ile Arg Ser Ala
 180 185 190
 Val Pro Ser Pro Ile Gln Asn Thr Leu Gln Asn Val Leu Ala Ala Ala
 195 200 205
 Thr Lys Arg Asn Cys Asn Val Thr Gln Met Arg Glu Leu Pro Val Leu
 210 215 220
 Asp Ser Ala Ala Phe Asn Val Asp Cys Phe Lys Lys Tyr Ala Cys Asn
 225 230 235 240
 Asp Glu Tyr Trp Asp Thr Phe Arg Asp Asn Pro Ile Arg Leu Thr Thr
 245 250 255
 Glu Asn Val Thr Gln Tyr Val Thr Lys Leu Lys Gly Pro Lys Ala Ala
 260 265 270

Ala Leu Phe Ala Asn Thr His Asn Leu Lys Pro Leu Gln Glu Ile Pro
 275 280 285
 Met Asp Gln Phe Val Met Asp Leu Lys Arg Asp Val Lys Val Thr Pro
 290 295 300
 Gly Thr Lys His Thr Glu Glu Arg Pro Lys Val Gln Val Ile Gln Ala
 305 310 315 320
 Ala Asp Pro Leu Ala Thr Ala Tyr Leu Cys Gly Ile His Arg Glu Leu
 325 330 335
 Val Arg Arg Leu Asn Ala Val Leu Leu Pro Asn Ile His Thr Leu Phe
 340 345 350
 Asp Met Ser Ala Glu Asp Phe Asp Ala Ile Ile Ala Glu His Phe His
 355 360 365
 His Gly Asp Pro Val Leu Glu Thr Asp Ile Ala Ser Phe Asp Lys Ser
 370 375 380
 Glu Asp Asp Ala Ile Ala Ile Ser Ala Leu Met Ile Leu Glu Asp Leu
 385 390 395 400
 Gly Val Asp Gln Pro Leu Leu Asp Leu Ile Glu Ala Ala Phe Gly Asn
 405 410 415
 Ile Thr Ser Val His Leu Pro Thr Gly Thr Arg Phe Lys Phe Gly Ala
 420 425 430
 Met Met Lys Ser Gly Met Phe Leu Thr Leu Phe Val Asn Thr Leu Val
 435 440 445
 Asn Ile Met Ile Ala Ser Arg Val Leu Arg Glu Arg Leu Thr Thr Ser
 450 455 460
 Ala Cys Ala Ala Ser Ile Gly Asp Asp Asn Ile Val His Gly Val Val
 465 470 475 480
 Ser Asp Thr Leu Met Ala Glu Arg Cys Ala Thr Trp Leu Asn Met Glu
 485 490 495
 Val Lys Ile Ile Asp Ala Val Ile Gly Ile Lys Ala Pro Tyr Phe Cys
 500 505 510
 Gly Gly Phe Ile Leu Val Asp Gln Ile Thr Gly Thr Ala Cys Arg Val
 515 520 525
 Ala Asp Pro Leu Lys Arg Leu Phe Lys Leu Gly Lys Pro Leu Pro Val
 530 535 540
 Asp Asp Thr Gln Asp Cys Asp Arg Arg Arg Ala Leu His Asp Glu Ala
 24

[illegible]

Met 1	Phe	Pro	Tyr	Pro 5	Gln	Leu	Asn	Phe	Pro 10	Pro	Val	Tyr	Pro	Thr 15	Asn
Pro	Met	Ala	Tyr 20	Arg	Asp	Pro	Asn	Pro 25	Pro	Arg	Arg	Arg	Trp 30	Arg	Pro
Phe	Arg	Pro 35	Pro	Leu	Ala	Ala	Gln 40	Ile	Glu	Asp	Leu	Arg 45	Arg	Ser	Ile
Val	Asn 50	Leu	Thr	Phe	Lys	Gln 55	Arg	Ser	Pro	Asn	Pro 60	Pro	Pro	Gly	Pro
Pro 65	Pro	Lys	Lys	Lys	Lys 70	Ser	Ala	Pro	Lys	Pro 75	Lys	Pro	Thr	Gln	Pro 80
Lys	Lys	Lys	Lys	Gln 85	Gln	Ala	Lys	Arg	Thr 90	Lys	Arg	Lys	Pro	Lys 95	Pro
Gly	Lys	Arg	Gln 100	Arg	Met	Cys	Met	Lys 105	Leu	Glu	Ser	Asp	Lys 110	Thr	Phe
Pro	Ile	Met 115	Leu	Asn	Gly	Gln	Val 120	Asn	Gly	Tyr	Ala	Cys 125	Val	Val	Gly
Gly	Arg 130	Leu	Met	Lys	Pro	Leu 135	His	Val	Glu	Gly	Lys 140	Ile	Asp	Asn	Glu
Gln 145	Leu	Ala	Ala	Val	Lys 150	Leu	Lys	Lys	Ala	Ser 155	Met	Tyr	Asp	Leu	Glu 160
Tyr	Gly	Asp	Val	Pro 165	Gln	Asn	Met	Lys	Ser 170	Asp	Thr	Leu	Gln 175	Tyr	Thr

Ser Asp Lys Pro Pro Gly Phe Tyr Asn Trp His His Gly Ala Val Gln
 180 185 190
 Tyr Glu Asn Gly Arg Phe Thr Val Pro Arg Gly Val Gly Gly Lys Gly
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Gly	Pro	Ile	Ser	Ala 965	Ala	Phe	Ser	Pro	Phe 970	Asp	His	Lys	Val	Val 975	Ile				
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<220>

<221> CDS

<222> (159)..(3869)

<223> vector sequence 1-9; 5' SacI primer 9-20; 3' end of NS4 gene 16-14; intragenic region 115-158; polyprotein (C-E3-E2-6K-E1) 159-3856; pcDW-XH7 nontranslated region 3857-4150

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taggtgacgt agtagacacg cacctaccca ccggcaga atg ttt cca tac cct cag	176
Met Phe Pro Tyr Pro Gln	
1 5	
ctg aac ttt cca cca gtt tac cct aca aat ccg atg gct tac cga gat	224
Leu Asn Phe Pro Pro Val Tyr Pro Thr Asn Pro Met Ala Tyr Arg Asp	
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Pro Asn Pro Pro Arg Arg Arg Trp Arg Pro Phe Arg Pro Pro Leu Ala	
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Ala Gln Ile Glu Asp Leu Arg Arg Ser Ile Val Asn Leu Thr Phe Lys	
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Gln Arg Ser Pro Asn Pro Pro Pro Gly Pro Pro Lys Lys Lys Lys	
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Ser Ala Pro Lys Pro Lys Pro Thr Gln Pro Lys Lys Lys Lys Gln Gln	
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Ala Lys Arg Thr Lys Arg Lys Pro Lys Pro Gly Lys Arg Gln Arg Met	
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Cys Met Lys Leu Glu Ser Asp Lys Thr Phe Pro Ile Met Leu Asn Gly	
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Gln Val Asn Gly Tyr Ala Cys Val Val Gly Gly Arg Leu Met Lys Pro	
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Leu Lys Lys Ala Ser Met Tyr Asp Leu Glu Tyr Gly Asp Val Pro Gln	
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Asn Met Lys Ser Asp Thr Leu Gln Tyr Thr Ser Asp Lys Pro Pro Gly	
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Phe Tyr Asn Trp His His Gly Ala Val Gln Tyr Glu Asn Gly Arg Phe	
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Thr Val Pro Arg Gly Val Gly Gly Lys Gly Asp Ser Gly Arg Pro Ile	
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gtg Val	acc Thr	att Ile	agg Arg 250	gat Asp	acc Thr	ccc Pro	gaa Glu	ggt Gly 255	tct Ser	gaa Glu	ccg Pro	tgg Trp	tca Ser 260	cta Leu	gtt Val	944				
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Ala	Val	Leu	Lys	Glu	Ala	Thr	Thr	His	Val	Thr	Ala	Val	Gly	Ser	
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Pro	Pro	Ala	Asp	His	Ile	Ile	Gly	Glu	Pro	His	Lys	Val	Asp	Gln	
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Glu	Phe	Gln	Ala	Ala	Val	Ser	Lys	Thr	Ser	Trp	Asn	Trp	Leu	Leu	
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Ala	Leu	Phe	Gly	Gly	Ala	Ser	Ser	Leu	Ile	Val	Val	Gly	Leu	Ile	
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<213> Western equine encephalomyelitis virus - strain 71V-1658

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Val Asn Leu Thr Phe Lys Gln Arg Ser Pro Asn Pro Pro Pro Gly Pro
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Pro Pro Lys Lys Lys Lys Ser Ala Pro Lys Pro Lys Pro Thr Gln Pro
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Lys Lys Lys Lys Gln Gln Ala Lys Arg Thr Lys Arg Lys Pro Lys Pro
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Gly Lys Arg Gln Arg Met Cys Met Lys Leu Glu Ser Asp Lys Thr Phe
100 105 110

Pro Ile Met Leu Asn Gly Gln Val Asn Gly Tyr Ala Cys Val Val Gly
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Gly Arg Leu Met Lys Pro Leu His Val Glu Gly Lys Ile Asp Asn Glu
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Gln Leu Ala Ala Val Lys Leu Lys Lys Ala Ser Met Tyr Asp Leu Glu
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Tyr Gly Asp Val Pro Gln Asn Met Lys Ser Asp Thr Leu Gln Tyr Thr
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Ser Asp Lys Pro Pro Gly Phe Tyr Asn Trp His His Gly Ala Val Gln
180 185 190

Tyr Glu Asn Gly Arg Phe Thr Val Pro Arg Gly Val Gly Gly Lys Gly
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Asp Ser Gly Arg Pro Ile Leu Asp Asn Arg Gly Arg Val Val Ala Ile
210 215 220

Val Leu Gly Gly Ala Asn Glu Gly Thr Arg Thr Ala Leu Ser Val Val
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Thr Trp Asn Gln Lys Gly Val Thr Ile Arg Asp Thr Pro Glu Gly Ser
245 250 255

Glu Pro Trp Ser Leu Val Thr Ala Leu Cys Val Leu Ser Asn Val Thr
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Phe	Pro	Cys ₂₇₅	Asp	Lys	Pro	Pro	Val ₂₈₀	Cys	Tyr	Ser	Leu	Thr ₂₈₅	Pro	Glu	Arg				
Thr	Leu ₂₉₀	Asp	Val	Leu	Glu	Glu ₂₉₅	Asn	Val	Asp	Asn	Pro ₃₀₀	Asn	Tyr	Asp	Thr				
Leu ₃₀₅	Leu	Glu	Asn	Val	Leu ₃₁₀	Lys	Cys	Pro	Ser	Arg ₃₁₅	Arg	Pro	Lys	Arg	Ser ₃₂₀				
Ile	Thr	Asp	Asp	Phe ₃₂₅	Thr	Leu	Thr	Ser	Pro ₃₃₀	Tyr	Leu	Gly	Phe	Cys ₃₃₅	Pro				
Tyr	Cys	Arg	His ₃₄₀	Ser	Thr	Pro	Cys	Phe ₃₄₅	Ser	Pro	Ile	Lys	Ile ₃₅₀	Glu	Asn				
Val	Trp	Asp ₃₅₅	Glu	Ser	Asp	Asp	Gly ₃₆₀	Ser	Ile	Arg	Ile	Gln ₃₆₅	Val	Ser	Ala				
Gln	Phe ₃₇₀	Gly	Tyr	Asn	Gln	Ala ₃₇₅	Gly	Thr	Ala	Asp	Val ₃₈₀	Thr	Lys	Phe	Arg				
Tyr ₃₈₅	Met	Ser	Phe	Asp	His ₃₉₀	Asp	His	Asp	Ile	Lys ₃₉₅	Glu	Asp	Ser	Met	Glu ₄₀₀				
Lys	Ile	Ala	Ile	Ser ₄₀₅	Thr	Ser	Gly	Pro	Cys ₄₁₀	Arg	Arg	Leu	Gly	His ₄₁₅	Lys				
Gly	Tyr	Phe	Leu ₄₂₀	Leu	Ala	Gln	Cys	Pro ₄₂₅	Pro	Gly	Asp	Ser	Val ₄₃₀	Thr	Val				
Ser	Ile	Thr ₄₃₅	Ser	Gly	Ala	Ser	Glu ₄₄₀	Asn	Ser	Cys	Thr	Val ₄₄₅	Glu	Lys	Lys				
Ile	Arg ₄₅₀	Arg	Lys	Phe	Val	Gly ₄₅₅	Arg	Glu	Glu	Tyr	Leu ₄₆₀	Phe	Pro	Pro	Val				
His ₄₆₅	Gly	Lys	Leu	Val	Lys ₄₇₀	Cys	His	Val	Tyr	Asp ₄₇₅	His	Leu	Lys	Glu	Thr ₄₈₀				
Ser	Ala	Gly	Tyr	Ile ₄₈₅	Thr	Met	His	Arg	Pro ₄₉₀	Gly	Pro	His	Ala	Tyr ₄₉₅	Lys				
Ser	Tyr	Leu	Glu ₅₀₀	Glu	Ala	Ser	Gly	Glu ₅₀₅	Val	Tyr	Ile	Lys	Pro ₅₁₀	Pro	Ser				
Gly	Lys	Asn ₅₁₅	Val	Thr	Tyr	Glu	Cys ₅₂₀	Lys	Cys	Gly	Asp	Tyr ₅₂₅	Ser	Thr	Gly				
Ile	Val ₅₃₀	Ser	Thr	Arg	Thr	Lys ₅₃₅	Met	Asn	Gly	Cys	Thr ₅₄₀	Lys	Ala	Lys	Gln				

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 580 585 590
 Pro Thr Val Thr Lys Trp Phe Lys Gly Ile Thr Leu His Leu Thr Ala
 595 600 605
 Met Arg Pro Thr Leu Leu Thr Thr Arg Lys Leu Gly Leu Arg Ala Asp
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 Ala Thr Ala Glu Trp Ile Thr Gly Ser Thr Ser Arg Asn Phe Ser Val
 625 630 635 640
 Gly Arg Glu Gly Leu Glu Tyr Val Trp Gly Asn His Glu Pro Val Arg
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 Val Trp Ala Gln Glu Ser Ala Pro Gly Asp Pro His Gly Trp Pro His
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 Glu Ile Ile Ile His Tyr Tyr His Arg His Pro Val Tyr Thr Val Ile
 675 680 685
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 Thr Val Ala Asp Cys Ile Tyr Ser Ala Asp Phe Gly Gly Ser Leu
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